

Claims:

1. A modular muffle etch injector assembly for use in a gas blanketed down-flow chemical vapor deposition apparatus of the type having a muffle and a modular gas injector assembly for introducing chemical vapors into a deposition chamber, the muffle being adapted for receiving and supporting the gas injector assembly, wherein deposition material residue collects on a lower surface of the muffle, the etch injector assembly comprising:

5           a. an etch chamber having vertical sidewalls, a closed top end and an open bottom end;

10           b. a supply means for introducing a liquid etchant into the etch chamber; and

15           c. a sealing means disposed along the bottom end of the etch chamber for providing a seal between the etch chamber and the lower surface of the muffle to confine the etchant to the etch chamber.

2. An etch injector assembly according to Claim 1, further comprising an exhaust means for removing chemical vapors from the etch chamber.

20           3. An etch injector assembly according to Claim 1, wherein the etch chamber is adapted to replace the gas injector assembly in the muffle during maintenance operations for removing the residue from the lower surface of the muffle by introducing the liquid etchant into the etch chamber and on to the lower surface of the muffle.

25           4. An etch injector assembly according to Claim 1, further comprising a viewing means in the etch chamber for viewing the lower surface of the muffle.

5. A modular muffle etch injector assembly for use in a gas blanketed down-flow chemical vapor deposition apparatus of the type having a muffle and a modular gas injector assembly for introducing chemical vapors into a deposition chamber, the muffle being adapted for receiving and supporting the gas injector assembly, wherein deposition material residue collects on a lower surface of the muffle, the etch injector assembly comprising:

10 a. a box-shaped etch chamber having a rectangular cross section and being open at a bottom end, the etch chamber comprising opposing sidewalls, opposing endwalls extending between the sidewalls, and a top cover plate attached to the sidewalls and endwalls;

b. an inlet port in the cover plate through which a liquid etchant may be introduced into the etch chamber;

15 c. an exhaust port in the cover plate through which chemical vapors may be removed from the etch chamber; and

d. a sealing means disposed along bottom surfaces of the sidewalls and endwalls for providing a seal between the open end of the etch chamber and the lower surface of the muffle to confine 20 the etchant to the etch chamber.

6. A muffle etch injector assembly according to Claim 5, wherein the etch chamber is sized and shaped to replace the gas injector assembly in the muffle during maintenance operations for removing the residue from the lower surface of the muffle by 25 introducing the liquid etchant into the etch chamber and on to the lower surface of the muffle.

7. A muffle etch injector assembly according to Claim 5, further comprising a supply means for introducing the liquid etchant into the etch chamber through the inlet port.

8. A muffle etch injector assembly according to Claim 5, wherein the sealing means comprises an "O" ring disposed in a recess along the bottom surfaces of the sidewalls and the endwalls.

5 9. A muffle etch injector assembly according to Claim 5, further comprising an exhaust means connected to the exhaust port for removing chemical vapors from the etch chamber.

10 10. An etch injector assembly according to Claim 5, further comprising a viewing means in the etch chamber for viewing the lower surface of the muffle.

11. A muffle etch injector assembly according to Claim 5, wherein the sidewalls, endwalls and cover plate are made of poly vinylidene flouride (PVDF) material.

15 12. A muffle etch injector assembly according to Claim 6, wherein the cover plate includes a flange area extending laterally beyond the sidewalls and endwalls, the flange area being adapted to support the etch injector assembly when it is installed in the muffle.

20 13. A muffle etch injector assembly according to Claim 7, wherein the supply means comprises a reservoir for storing liquid etchant, a conduit connected to the reservoir and a valve disposed within the conduit, the valve being operative to move from an open position in which the etchant flows from the reservoir through the conduit into the etch chamber to a closed position in which the etchant is prevented from flowing from the reservoir.

14. A muffle etch injector assembly according to Claim 10, wherein the viewing means comprises a sight glass disposed on the cover plate.